9_6625-2131-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR

OSCILLOSCOPE OS-266(P)/U and TEKTRONIX, TYPES 7844/R7844

NEWARK PUBLIC LIBRARY
MAY 15 1985
U. S. GOVT. PUBS.
DEPOSITORY 376

Headquarters, Department of the Army, Washington, DC
12 March 1985

REPORTING OF ERRORS

You can help improve this publication by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications, should be mailed directly to Commander, US Army TMDE Support Group, ATTN: AMXTM-LPE, Redstone Arsenal, AL 35898-5400. A reply will be furnished directly to you.

			Paragraph	Page
SECTION	I.	IDENTIFICATION AND DESCRIPTION		
		Test instrument identification	1	2
		DA Form 2416 (Calibration Data Card)	2	2
		Calibration description	3	2
	II.	EQUIPMENT REQUIREMENTS		
		Equipment required	4	3
		Accessories required	5	3
	III.	CALIBRATION PROCESS		
		Preliminary instructions	6	4
		Equipment setup	7	5
		Calibrator amplitude	8	5
		Calibrator repetition rate	9	8
		Calibrator risetime	10	8
		Horizontal amplifier gain	11	8
		Horizontal high-frequency compensation	12	11
		Vertical centering	13	13
		Vertical amplifier gain	14	16
		Vertical crossover gain	15	16
		Vertical high-frequency compensation	16	17
		Vertical amplifier 400 MHz gain	17	18
		Power supply	18	18
		Final procedure	19	20

*This bulletin supersedes TB 11-6625-2748-50, 30 September 1976, including all changes.

READEX FICHE best copy available

D 101.25:

SECTION I

IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Oscilloscope OS-266(P)/U and Tektronix, Types 7844/R7844. The manufacturer's manual was used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. Horizontal section adjustment locations and labeling differ among serial numbers, which are noted in text.

b. Time and Technique. The time required for this calibration is approximately 3 hours, using the dc and low frequency technique.

2. DA Form 2416 (Calibration Data Card)

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25-1. DA Form 2416 must be annotated in accordance with TB 750-25-1 for each calibration performed.

b. Adjustments to be reported on DA Form 2416 are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Calibrator output	Ranges: 4 and 40 mV, 0.4 and 4 V into 100 kΩ or more 0.4, 4, and 40 mV and 0.4 V into 50Ω Accuracy: ±1% Repetition rate: 1 kHz ±0.25% Risetime: 250 ns or less
Deflection factor: horizontal and vertical	Compatible with all 7000 series plug-in units. Difference between compartments, less than 1%
High-frequency compensation:	
Horizontal	Aberrations: 0.15 div or less
Vertical	Aberrations: 0.5 minor div or less at 1 kHz, 2 minor div p-p at 1 MHz
Horizontal and vertical centering	Within 0.5 div of graticule center

SECTION II

EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-286. Alternate items may be used by the calibrating activity when the equipment listed in table 2 is not available. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI.

5. Accessories Required. The accessories listed in table 3 are issued as indicated in paragraph 4 above and are used in this calibration procedure. When necessary, these items may be substituted by equivalent items, unless specifically prohibited.

Table 2. Minimum Specifications of Equipment Required

Item	Common name	Minimum use specifications	Manufacturer and model (part number)
A1	AUTOTRANSFORMER	Range: 105 to 125 V ac Accuracy: ±1%	General Radio, Model W10MT3AS3 or Ridge, Model 9020F (7910809)
A2	CALIBRATION FIXTURE	Must be compatible with TI	Tektronix, Type 067-0587-01 (MIS-10258)
A3	DIGITAL VOLTMETER	Range: -50 to +135 V dc Accuracy: ±0.2%	Hewlett-Packard, Model 3490AOPT060 (3490AOPT060)
A4	FREQUENCY COUNTER	Range: 997.5 to 1002.5 Hz Accurcy: ±0.06%	Hewlett-Packard, Model 5345A (MIS-28754/1 Type 1)
A5	OSCILLOSCOPE	Range: Dc to 5 MHz w/ deflection factor 1 to 10 V/div Accuracy: ±3%	Tektronix, Type R5440 (MIS-28706/1) Type 1) w/5A48 (MIS-28706/3) and 5B42 (MIS-28706/4) and 5S14 (MIS-28706/5)
A6	SIGNAL GENERATOR	Range: 20 to 400 MHz Accuracy: ±3%	Hewlett-Packard, Model 8640BOPTH66 (MIS-28707 Type 1)
A7	TIME BASE	Must be compatible with A2 and TI	Tektronix, Type 7B series

Table 3. Accessories Required

Item	Common name	Description (part number)
B1	ADAPTER	N plug to BNC jack (10519457) (UG201A/U)
B2	ADAPTER	BNC jack to double banana plug terminations (7907592)
B3	CABLE	30-in., RG-58/U; BNC plug terminations (7907467)
B4	CABLE	36-in., RG-58/U; BNC plug to double banana plug terminations (7907471)
B5	CABLE	36-in., BNC plug to two alligator clips (7907410)
B6	CABLE	BSM jack to BNC plug (012-0127-00)

SECTION III

CALIBRATION PROCESS

6. Preliminary Instructions

a. The instructions outlined in paragraphs 6 and 7 are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name and item identification number as listed in tables 2 and 3. For the identification of equipment referenced by item numbers prefixed with A, see table 2, and for prefix B, see table 3.

WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions.

NOTE

Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacturer's manual for this TI.

NOTE

When indications specified in paragraphs 8 through 17 are not within tolerance, perform the power supply check prior to making adjustments. After adjustments are made, repeat paragraphs 8 through 17. Do not perform power supply check if all other parameters are within tolerance.

NOTE

Unless otherwise specified, all controls and control settings refer to the TI.

CAUTION

Set POWER switch to OFF prior to removal of plug-ins. Set POWER switch to on after plug-ins are inserted.

7. Equipment Setup

NOTE

This procedure was written using Tektronix 067-0587-01 calibration fixture and 7B70 time base.

a. Remove protective covers as required to make adjustments.

b. Connect autotransformer (A1) to a 115-V ac source and adjust for 115 V output.

c. Set TI voltage selector switch (rear panel) to 115 V.

d. Install time base (A7) in B HORIZ compartment.

e. Connect TI to autotransformer and position TI control as listed in (1) through (9) below:

(1) CALIBRATOR switch to 4V.

(2) READOUT INTENSITY control to off (fully ccw).

(3) A TRIG SOURCE switch to LEFT.

(4) B TRIG SOURCE switch to RIGHT.

(5) GRAT ILLUM fully ccw (pushbuttons to out position on some types).

(6) BEAM 1 controls as listed in (a) through (g) below:

(a) INTEN control to off (fully ccw).

(b) VERT SEP (1) control to midrange.

(c) HORIZ SEP (1) control to midrange.

(d) FOCUS control to midrange.

(e) VERTICAL MODE switch to LEFT.

(f) BEAMFINDER pushbutton out.

(g) HORIZONTAL MODE switch to A.

(7) BEAM 2 controls as listed in (a) through (e) below:

(a) INTEN control to off (fully ccw).

(b) FOCUS control to midrange.

(c) VERTICAL MODE switch to RIGHT.

(d) BEAM FINDER pushbutton out.

(e) HORIZONTAL MODE switch to B.

(8) POWER switch to ON and allow at least 20 minutes for warmup.

(9) GRAT ILLUM control to PULSED.

f. Set time base TIME/DIV or DLY TIME switch to 0.2 S.

g. Adjust BEAM 2 INTEN control for visible display on crt. Graticule illumination occurs only after beam 2 horizontal system has completed sweep. If required, adjust GRAT ILLUM PRESET control (front panel).

h. Adjust GRAT ILLUM control to midrange.

8. Calibrator Amplitude

a. Performance Check

(1) Connect digital voltmeter (A3) to TI CALIBRATOR output, using cable (B4).

(2) Press 4V and 0.4V CALIBRATOR pushbuttons. If digital voltmeter does not indicate between +0.4004 and +0.4012 V dc, perform **b** below.

(3) Adjust autotransformer (A1) between 105 and 125 V ac. Digital voltmeter will indicate between +0.4004 and +0.4012 V dc.

(4) Adjust autotransformer output to 115 V ac.

b. Adjustments. Adjust 4V ADJ A1 R915 (fig. 1) (see fig. 2 for board locations) (fig. 3 for type R7844) until digital voltmeter indicates +0.4008 V dc (R).

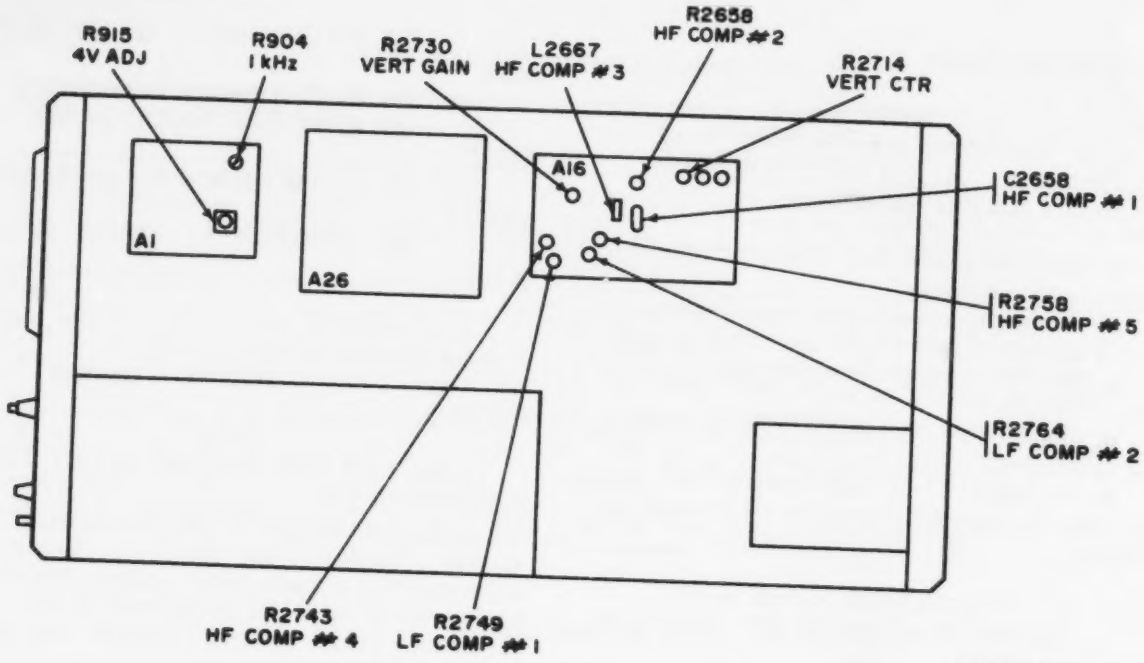


Figure 1. Test instrument - right side view.

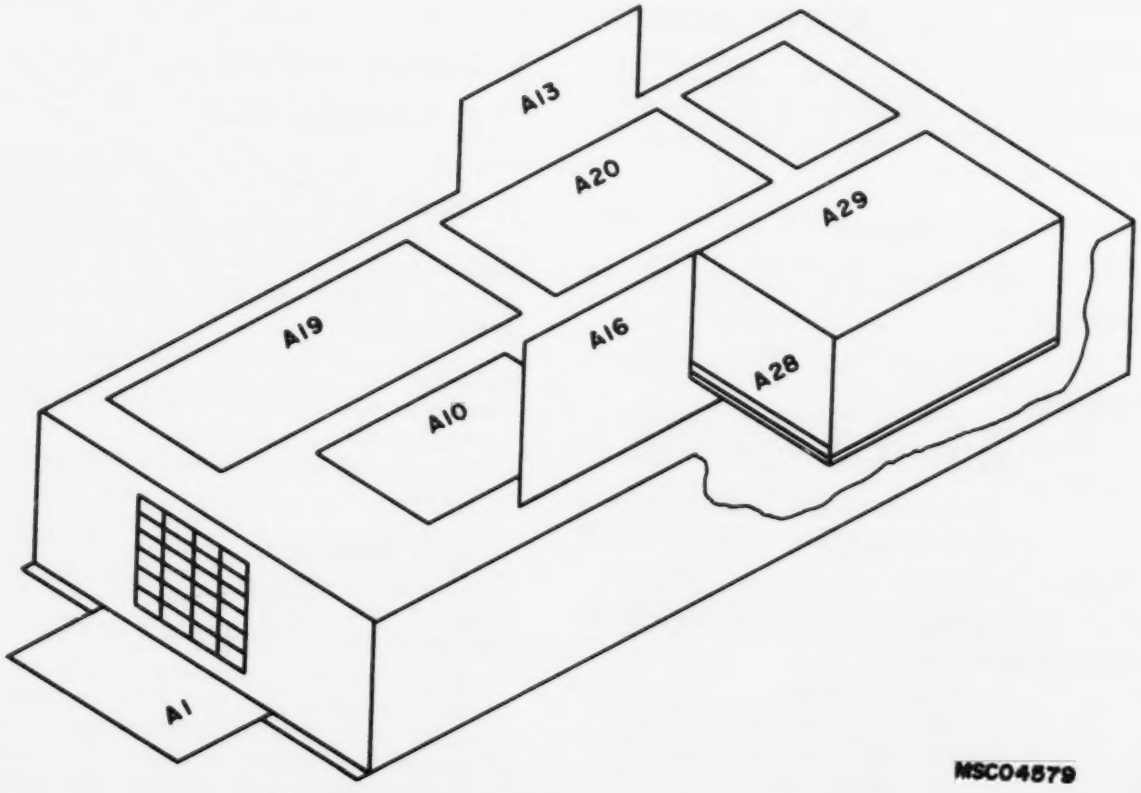
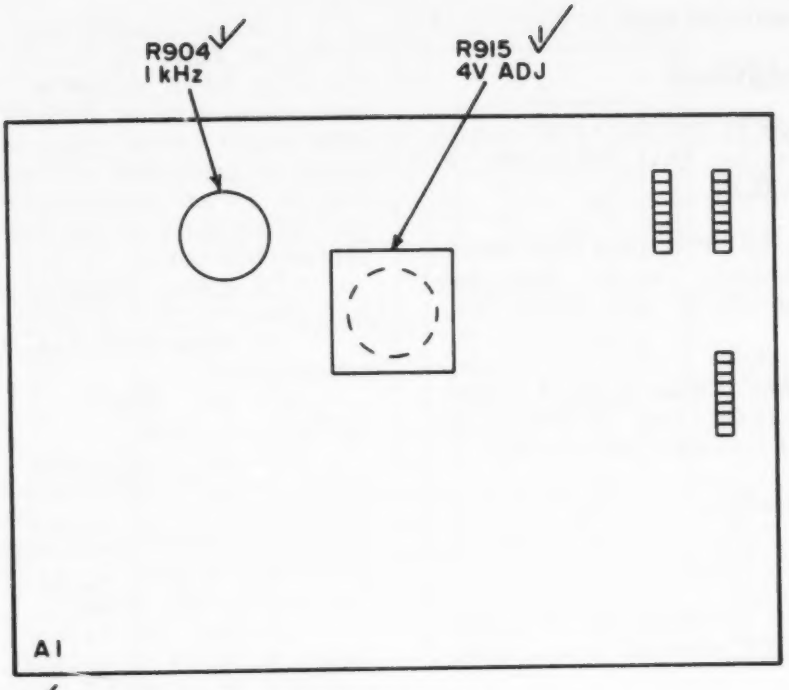


Figure 2. Type R7844 - board locations.



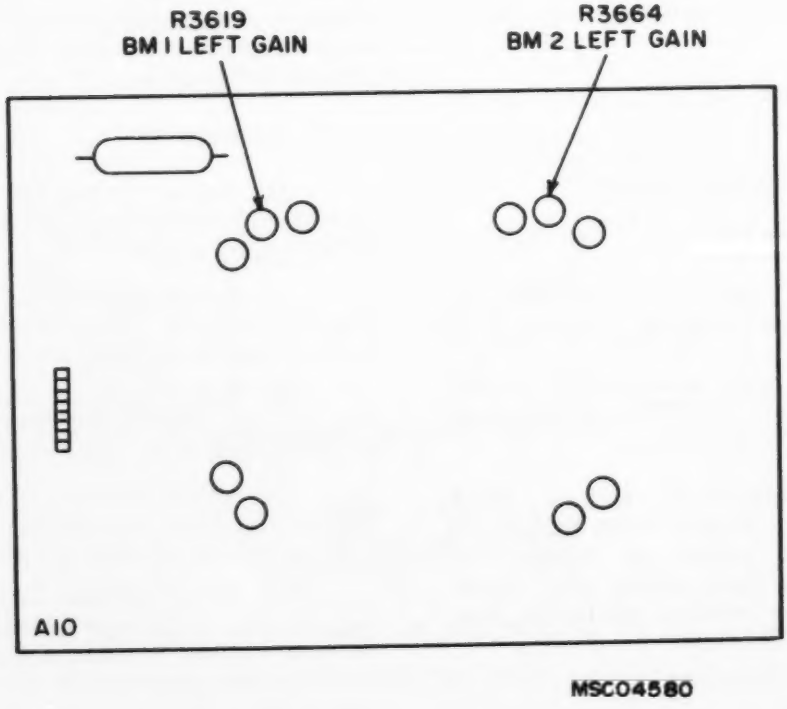


Figure 3. Calibrator - adjustment locations.

9. Calibrator Repetition Rate

a. Performance Check

(1) Connect TI CALIBRATOR output to frequency counter (A4) CHANNEL A input, using cable (B3).

(2) Press 4V CALIBRATOR push-button. If frequency counter does not indicate between 997.5 and 1002.5 Hz, perform b below.

b. Adjustments. Adjust 1 kHz A1 R904 (fig. 1) (fig. 3 for type R7844) until frequency counter indicates 1000 Hz (R).

10. Calibrator Risetime

a. Performance Check

(1) Connect TI CALIBRATOR output to oscilloscope (A5) vertical input, using cable (B3).

(2) Adjust oscilloscope for a well-defined, stable display.

(3) Measure risetime, using standard risetime technique. Risetime will be 250 ns or less.

b. Adjustments. No adjustments can be made.

11. Horizontal Amplifier Gain

a. Performance Check

(1) Adjust BEAM 2 INTEN and FOCUS controls for convenient display.

(2) Install time base (A7) in RIGHT VERT compartment and calibration fixture (A2) in B HORIZ compartment.

(3) Set calibration fixture TEST switch to VERT or HORIZ COM MODE and time base MODE switch to AUTO. If vertical trace is not within +0.5 minor division of center vertical graticule line, perform **b**(1) and (2) below.

(4) Set calibration fixture TEST switch to VERT or HORIZ GAIN position and REP RATE switch to 1 MHz. Adjust calibration fixture POSITION control to aline bright center trace with crt vertical graticule centerline. If display does not indicate 1 trace per graticule division within $\pm$0.5 minor division over center 8 divisions, perform **b**(3) below.

(5) Adjust BEAM 2 INTEN control fully ccw.

(6) Move time base to LEFT VERT compartment.

(7) Set BEAM 1 HORIZONTAL MODE switch to B.

(8) Set calibration fixture TEST switch to COM MODE and adjust BEAM 1 INTEN control for a suitable display. If horizontal centering of trace is not within $\pm$0.5 minor division of crt center graticule line, perform **b**(4) below.

(9) Set calibration fixture TEST switch to VERT or HORIZ GAIN position and REP RATE switch to 1 MHz. Adjust calibration fixture POSITION control to aline bright center trace with crt vertical graticule centerline. If display does not indicate 1 trace per graticule division within $\pm$0.5 minor division over center 8 divisions, perform **b**(5) below.

b. Adjustments

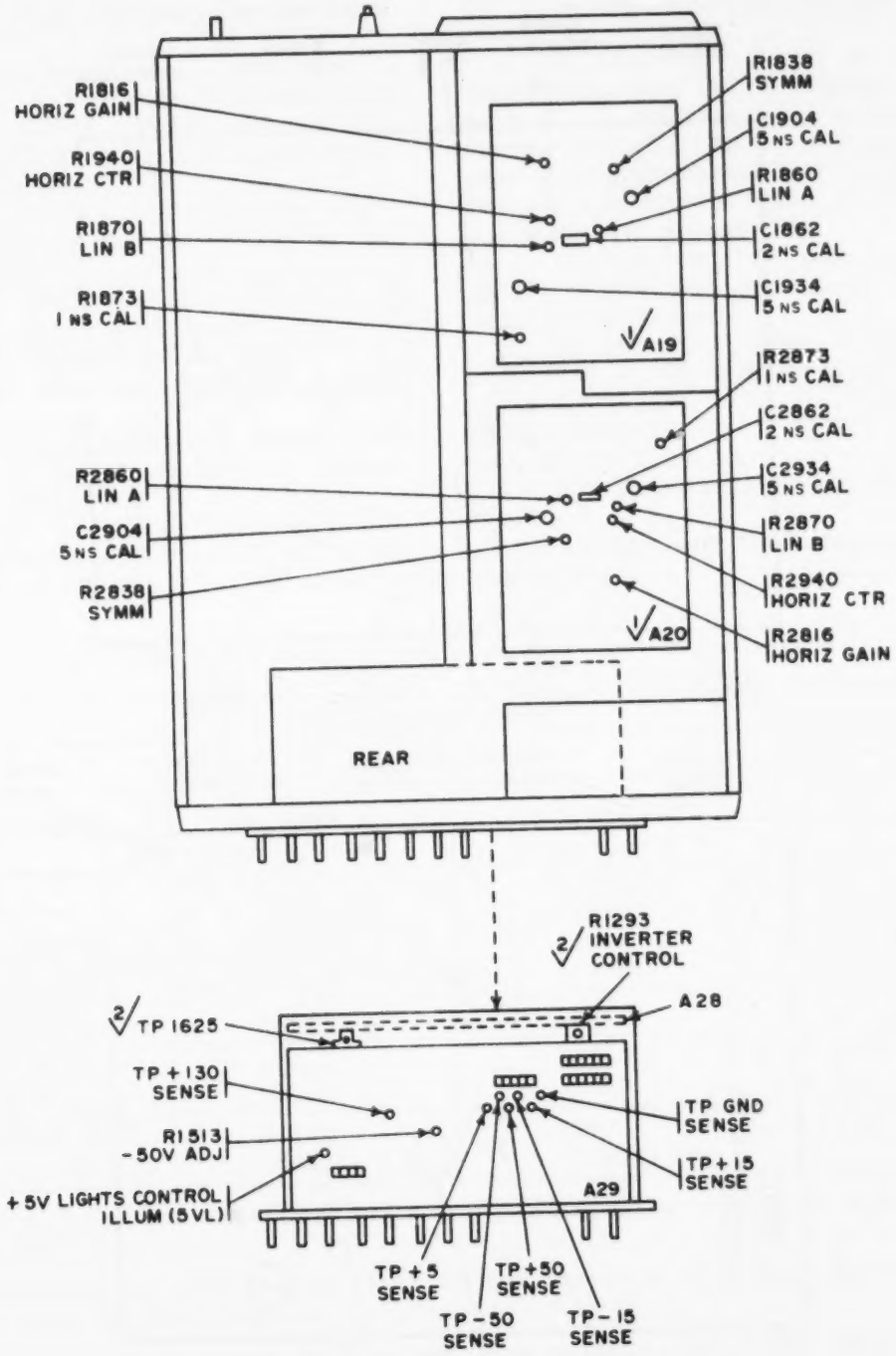
(1) Adjust SYMM A19 R1838 and SYMM A20 R2838 (fig. 4) (fig. 5 for type R7844) to midrange .

(2) Adjust HORIZ CTR A20 R2940 (fig. 4) (fig. 5 for type R7844) to aline trace with crt center vertical graticule line.

(3) Adjust HORIZ GAIN A20 R2816 (fig. 4) (fig. 5 for type R7844) for 1 division between each of 9 traces displayed on crt.

(4) Adjust HORIZ CTR A19 R1940 (fig. 4) (fig. 5 for type R7844) to aline trace with crt center vertical graticule line.

(5) Adjust HORIZ GAIN A19 R1816 (fig. 4) (fig. 5 for type R7844) for 1 division between each of 9 traces displayed on crt.



1/ FOR TYPE 7844 SN B110000 - UP. USE FIGURE 6.

2/ ACCESSIBLE THRU HOLES IN BOTTOM COVER.

MSC04581

Figure 4. Test instrument - top view.

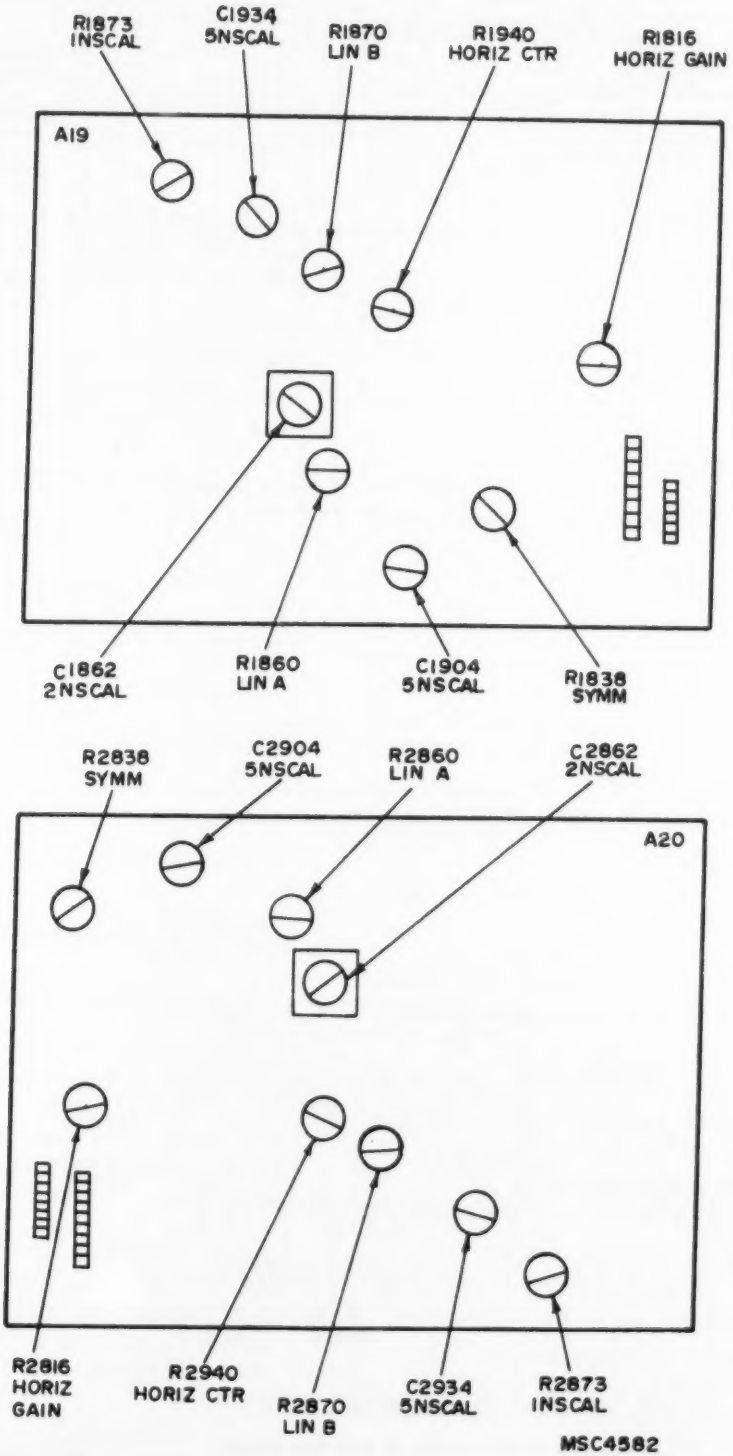


Figure 5. Horizontal adjustment location - (Type 7844 SN B109999-below) (Type R7844 SN B099999-below).

12. Horizontal High-Frequency Compensation

a. Performance Check

(1) Set B TRIG SOURCE switch to LEFT, adjust BEAM 2 INTEN control fully ccw, and BEAM 1 INTEN control for suitable display on crt.

(2) Set time base (A7) MAIN TRIGGERING switches as listed in (a) through (c) below:

(a) MODE switch to AUTO.

(b) COUPLING switch to AC.

(c) SOURCE switch to EXT.

(3) Set time base TIME/DIV or DLY TIME switch to .2 µs

(4) Connect calibration fixture (A2) TRIG OUT to time base external trigger input, using cable (B3).

(5) Set calibration fixture TEST switch to VERT or HORIZ +STEP RESP and adjust AMPLITUDE and POSITION controls for a 3-division display at crt graticule centerline.

(6) Check crt display at each time base sweep rate switch settings listed in table 4. If aberrations on displayed pulse exceed 0.15 division, or if total peak-to-peak aberrations exceed 2 divisions, perform beam 1 adjustments listed in table 4 for optimum pulse response.

(7) Remove time base from LEFT VERT compartment and install in RIGHT VERT compartment.

(8) Set B TRIG SOURCE and VERTICAL MODE switches to RIGHT.

(9) Adjust BEAM 1 INTEN control fully ccw, and BEAM 2 INTEN control for suitable display on crt.

(10) Repeat (5) through (7) above for beam 2.

b. Adjustments. No further adjustments can be made.

Table 4. Horizontal System High-Frequency Compensation

Test instrument			
Time base TIME/DIV switch settings	Adjustments (R)		Area of maximum effect
	A19 BEAM 1[1] (figs. 5 and 6)	A20 BEAM 2[1] (figs. 5 and 6)	
5 ns/div[3]	C1904 (C4850) C1934 (C4860)	C2904 (C5850) C2934 (C5860)	5 ns/div timing
2 ns/div	C1862	C2862	2 ns/div timing
1 ns/div[4] 2 ns/div	R1860 R1870	R2860 R2870	First half of sweep 2ns/div linearity
1 ns/div[4 5]	R1873 (C4823)	R2873 (C5823)	Last half of sweep

[1]Figure 5 is for type 7844 with SN B109999-below and type R7844 with SN B099999-below.

[2]Adjustments in parentheses (fig. 6) are for type 7844 with SN B110000, and type R7844 with SN B100000-above.

[3]Interaction exists between 5 ns and 1 ns adjust. Repeat for best compromise for type 7844 with SN B110000-above and type R7844 SN B10000-above.

[4]Lin A and lin B adjustment primarily affects 1 ns timing, but also affects 2 ns timing to a lesser degree.

[5]Effect of adjustment not noticeable with sweep rates below 1 ns/div.

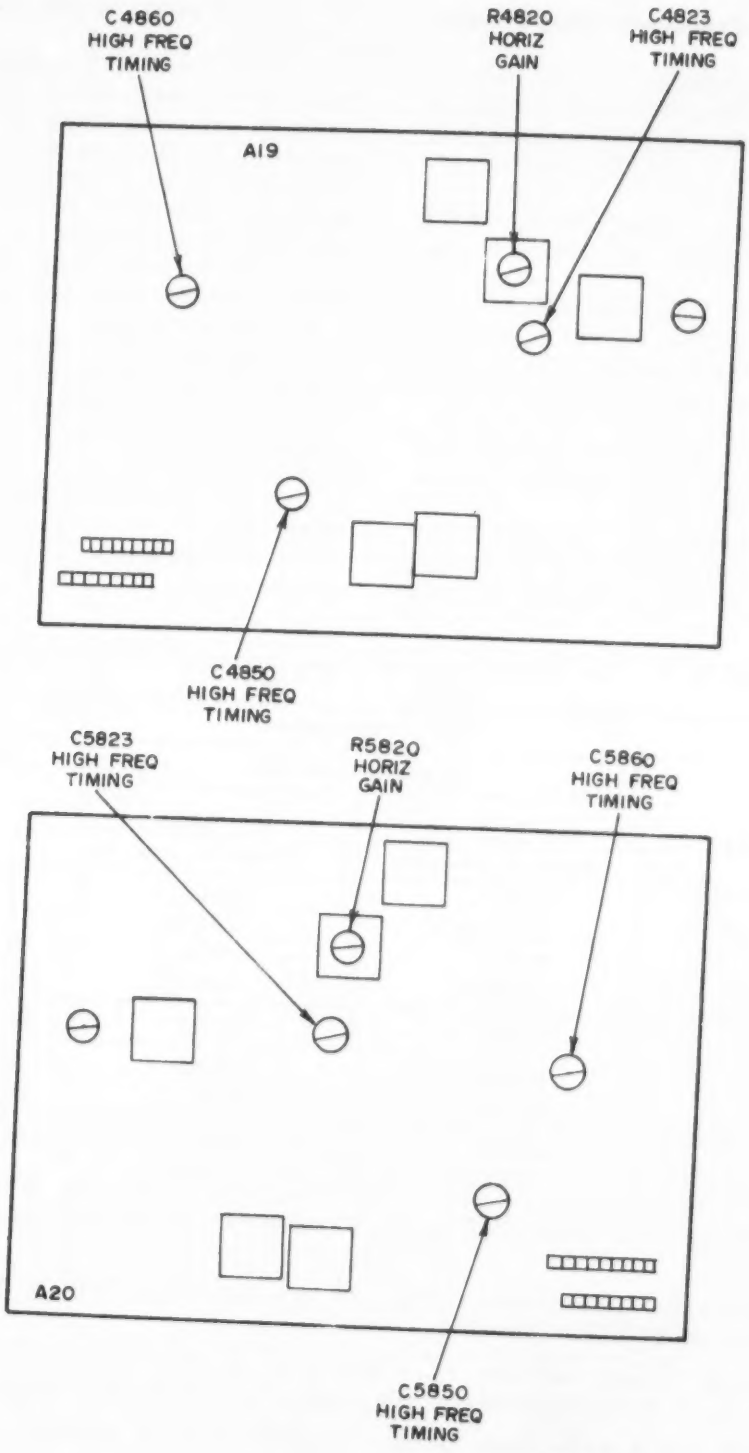


Figure 6. Horizontal adjustment location - (Type 7844 SN B110000-up) (R7844 SN B100000-up).

13. Vertical Centering

a. Performance Check

NOTE

Steps (1) through (14) below pertain to TIs without option 21 and (15) through (23) below for TIs with option 21.

(1) Install time base (A7) in A HORIZ compartment and calibration fixture (A2) in LEFT VERT compartment.

(2) Position controls as listed in (a) through (d) below:

(a) BEAM 1 INTEN control to midrange.

(b) BEAM 1 VERTICAL MODE switch to LEFT.

(c) BEAM 1 and 2 HORIZONTAL MODE switch to A.

(d) BEAM 2 INTEN control fully ccw.

(3) Set time base TIME/DIV or DLY TIME switch to 10 µs.

(4) Adjust BEAM 1 INTEN control for a suitable trace on crt.

(5) Adjust time base POSITION control to center trace on horizontal graticule centerline.

(6) Set calibration fixture TEST switch to VERT or HORIZ COM MODE. If trace does not remain within ±0.5 division of horizontal graticule centerline, perform b(1) below.

(7) Simultaneously switch VERTICAL MODE switches to BEAM 1 RIGHT and BEAM 2 LEFT while observing trace. If trace does not remain within ±0.5 division of horizontal graticule centerline, perform b(2) below.

(8) Move time base to B HORIZ compartment.

(9) Set VERTICAL MODE switch to BEAM 1 LEFT and BEAM 2 RIGHT.

(10) Set BEAM 1 INTEN control ccw.

(11) Set BEAM 2 HORIZONTAL MODE switch to B and adjust BEAM 2 INTEN control for suitable trace on TI.

(12) Adjust time base POSITION control to center trace on horizontal graticule centerline.

(13) Move calibration fixture to RIGHT VERT compartment. If trace does not remain within ±0.5 division of horizontal graticule centerline, perform b(3) below.

(14) Set BEAM 2 VERTICAL MODE switch from RIGHT to LEFT while observing trace. If trace does not remain within ±0.5 division of horizontal graticule centerline, perform b(4) below.

(15) Install time base (A7) in A HORIZ compartment and calibration fixture (A2) in LEFT VERT compartment.

(16) Position controls as listed in (a) through (c) below:

(a) BEAM 1 INTEN control to midrange.

(b) BEAMS 1 and 2 HORIZONTAL MODE switches to A.

(c) BEAM 2 INTEN control fully ccw.

(17) Set time base TIME/DIV or DLY TIME switch to 10 µs.

(18) Adjust BEAM 1 INTEN control for suitable trace on crt.

(19) Set calibration fixture TEST switch to VERT or HORIZ COM MODE. If trace does not remain within ±0.5 division of horizontal graticule centerline, perform b(1) below.

(20) Move time base to B HORIZ compartment.

(21) Set BEAM 2 HORIZONTAL MODE switch to B.

(22) Adjust BEAM 1 INTEN control to ccw.

(23) Adjust BEAM 2 INTEN control for suitable display on TI. If trace does not remain within ±0.5 division of horizontal graticule centerline, perform b(3) below.

b. Adjustments

(1) Adjust VERT CTR R1714 A13 (fig. 7) (fig. 8 for type R7844) until BEAM 1 trace is alined with horizontal graticule centerline (R).

(2) Adjust VERT CTR R1714 A13 until trace remains within ±0.5 division of horizontal graticule centerline while VERTICAL MODE switches are simultaneously switched from BEAM 1 RIGHT and BEAM 2 LEFT, and while adjusting R1714 for best compromise (R).

(3) Adjust VERT CTR R2714 A16 (fig. 1) (fig. 8 for type R7844) until BEAM 2 trace is alined with horizontal graticule centerline (R).

(4) Adjust R2714 A16 until trace remains within ±0.5 division of horizontal graticule centerline while VERTICAL MODE switches are simultaneously switched from BEAM 2 RIGHT and BEAM 1 LEFT, and while adjusting R2714 for best compromise (R).

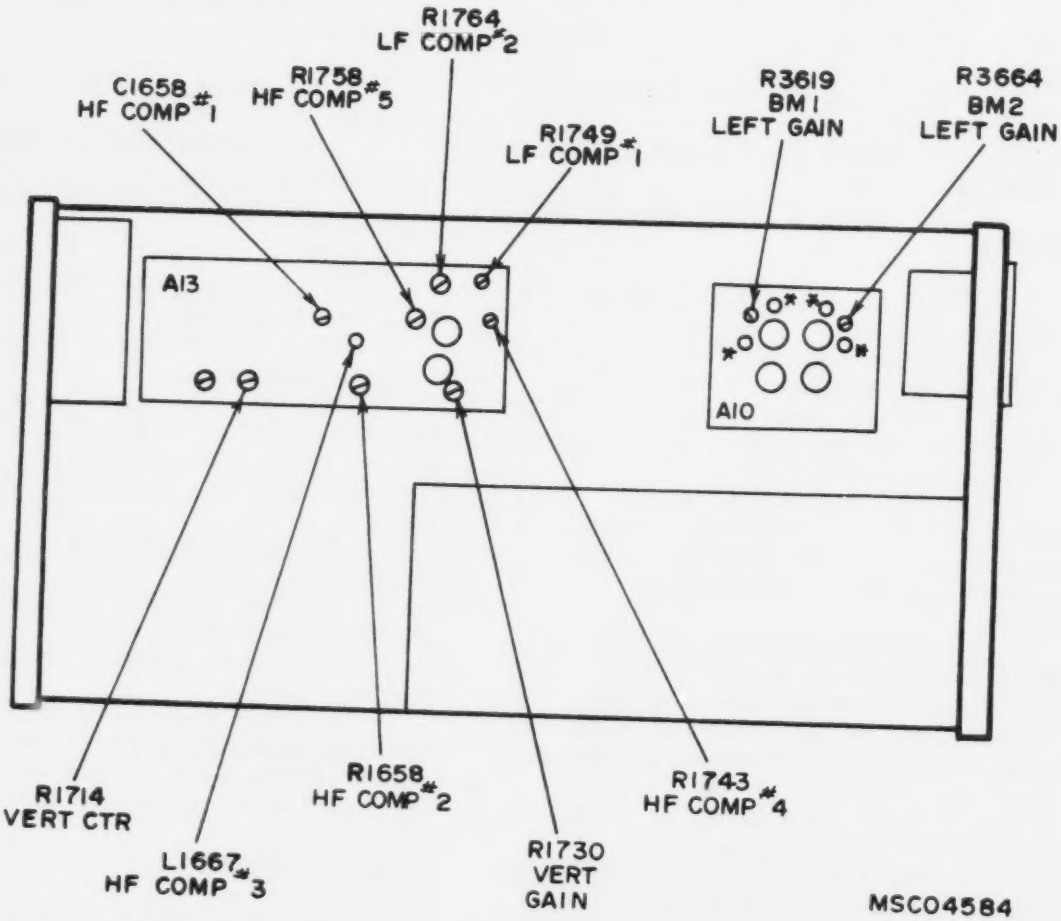


Figure 7. Test instrument - left side view.

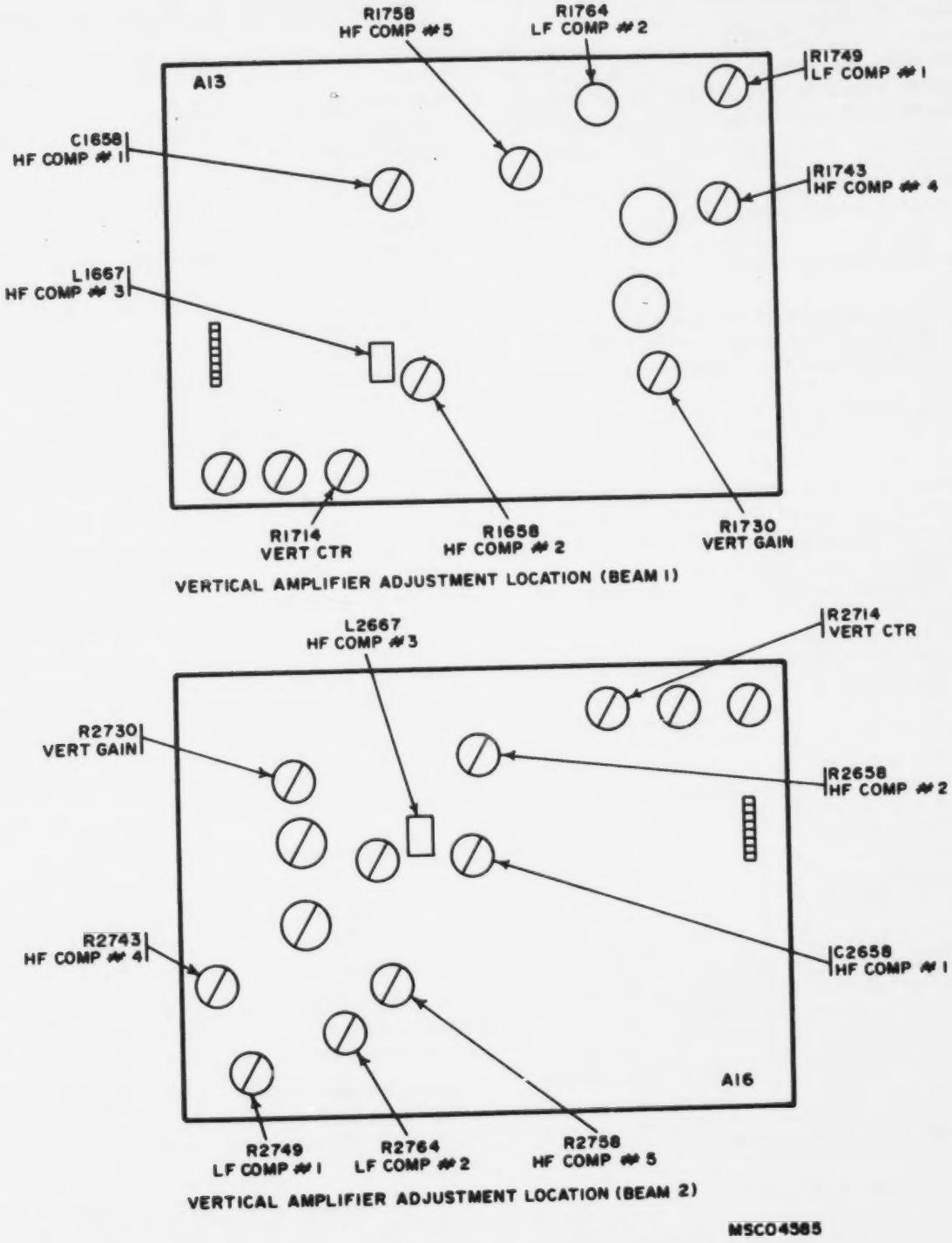


Figure 8. Test instrument boards A13 and A16.

14. Vertical Amplifier Gain

NOTE
Perform paragraph 14 for TIs with option 21. Perform paragraph 15 for TIs without option 21.

NOTE
BEAM 1 is horizontal mode A and BEAM 2 is horizontal mode B.

a. Performance Check

(1) Install calibration fixture (A2) in LEFT VERT compartment and time base (A7) in A HORIZ compartment.

(2) Set calibration fixture TEST switch to VERT or HORIZ GAIN, REP RATE switch to 1 MHz, and adjust POSITION control to aline bright center trace on horizontal graticule centerline. If display is not 1 trace per graticule line over center 6 divisions within ±0.5 minor division, perform b(1) below.

(3) Move calibration fixture to RIGHT VERT compartment and time base to B HORIZ compartment.

(4) Set BEAM 2 VERTICAL MODE switch to RIGHT.

(5) Adjust calibration fixture POSITION control to aline bright center trace with horizontal graticule centerline. If display is not 1 trace per graticule line over center 6 divisions within ±0.5 minor division, perform b(2) below.

b. Adjustments

(1) Adjust VERT GAIN A13 R1730 (fig. 7) (fig. 8 for type R7844) for 1 division between each 7 traces displayed on crt (R).

(2) Adjust VERT GAIN A16 R2730 (fig. 1) (fig. 8 for type R7844) for 1 division per graticule line over center 6 divisions (R).

15. Vertical Crossover Gain

a. Performance Check

(1) Set calibration fixture TEST switch to VERT or HORIZ GAIN, and adjust POSITION control to aline bright center trace on horizontal graticule centerline. If display is not 1 trace per graticule line over center 6 divisions within ±0.5 minor divisions, perform b(1) below.

(2) Move time base (A7) to A HORIZ compartment.

(3) Set BEAM 1 VERTICAL MODE switch to RIGHT and adjust VERT SEP (1) control to aline bright center trace with horizontal graticule centerline. If crt does not indicate 1 trace per graticule line within ±0.5 minor division over center 6 divisions, perform b(2) below.

(4) Move time base to B HORIZ compartment and calibration fixture to LEFT VERT compartment.

(5) Set BEAM 1 and BEAM 2 VERTICAL MODE switches to LEFT and adjust calibration fixture POSITION control to aline bright center trace with crt horizontal graticule center line. If trace does not aline with each graticule line within ±0.5 minor division over center 6 horizontal divisions, perform b(3) below.

(6) Move time base to A HORIZ compartment.

(7) Adjust VERT SEP (1) control to aline bright center trace with crt horizontal graticule center line. If trace does not aline with each graticule line within ±0.5 minor division over center 6 horizontal graticule divisions, perform b(4) below.

b. Adjustments

(1) Adjust VERT GAIN A16 R2730 (fig. 1) (fig. 8 for type R7844) for 1 trace per division over center 6 divisions (R).

(2) Adjust VERT GAIN A13 R1730 (fig. 7) (fig. 8 for type R7844) for 1 trace per division over center 6 divisions (R).

(3) Adjust BM2 LEFT GAIN A10 R3664 (fig. 7) (fig. 3 for type R7844) for 1 trace per division over center 6 divisions (R).

(4) Adjust BM1 LEFT GAIN A10 R3619 (fig. 7) (fig. 3 for type R7844) for 1 trace per division over center 6 divisions (R).

16. Vertical High-Frequency Compensation

a. Performance Check

(1) Set calibration fixture TEST switch to VERT or HORIZ +STEP RESP, REP RATE switch to 1 kHz, and adjust AMPLITUDE control for 6 divisions of display on crt.

(2) Position time base controls as listed in (a) through (d) below:

(a) TIME/DIV or DLY TIME switch to 0.5 ms.
(b) MODE switch to AUTO.
(c) Coupling switch to AC.
(d) Source switch to INT.

(3) Adjust LEVEL/SLOPE variable control for stable display.

(4) Adjust vertical amplifier and time base POSITION controls to center display. If displayed pulse does not have flat top within ±0.5 minor division, perform b(1) below.

(5) Set calibration fixture REP RATE switch to 1 MHz and time base sweep rate to 10 ns.

(6) Check areas of crt display at each time base sweep rate listed in table 5. If display pulse does not have optimum square leading corners. flat tops, and peak-to-peak aberrations are not within 2 minor divisions, perform beam 1 adjustments listed in table 5 for optimum pulse response. If necessary, repeat adjustment procedure to obtain optimum pulse response.

(7) Move calibration fixture to RIGHT VERT compartment, time base to B HORIZ compartment and set BEAM 2 VERT MODE to RIGHT.

(8) Repeat (2) and (3) above. If pulse displayed on crt does not have flat top within ±0.5 minor division, perform b(2) below.

(9) Repeat (4) and (5) above for beam 2.

b. Adjustments

(1) Adjust LF COMP#1 A13 R1749 and LF COMP#2 R1764 (fig. 7) (fig. 8 for type R7844) for flat top within ±0.5 minor division on crt.

(2) Adjust LF COMP#1 A16 R2749 and LF COMP#2 A16 R2764 (fig. 1) (fig. 8 for type R7844) for flat top within ±0.5 minor division on crt.

Table 5. High-Frequency Compensation

Test instrument			
	Adjustments (R)		
Optimum sweep rate	BEAM 1 (A13 fig. 7)[1]	BEAM 2 (A16 fig. 1)[1]	Primary area of pulse affected
10 nsec/div	HF COMP#4 R1743 HF COMP#5 R1758	HF COMP#4 R2743 HF COMP#5 R2758	First 100 nsec
2 nsec/div	HF COMP#3 L1667 HF COMP#1 C1658	HF COMP#3 L2667 HF COMP#1 C2658	First 2 nsec
2 nsec/div	HF COMP#2 R1658	HF COMP#2 R2658	First 5 nsec

[1] Figure 8 for type R7844.

17. Vertical Amplifier 400 MHz Gain

a. Performance Check

(1) Set calibration fixture (A2) TEST switch to VERT or HORIZ FREQ RESP.

(2) Connect signal generator (A6) RF output to calibration fixture FREQ RESP input, using cable and adapter (B6 and B1).

(3) Set time base (A7) sweep rate for .1 µs and set MODE switch to AUTO.

(4) Adjust signal generator frequency to 20 MHz and amplitude for 6 divisions of display on crt.

(5) Center the display on crt, using time base and calibration fixture POSITION controls.

(6) Maintain same signal generator output and increase frequency until crt display amplitude is reduced to 4.5 divisions. Signal generator will indicate 400 MHz or higher.

NOTE

Calibration fixture CW LEVELED light must be on in order to obtain proper results in (6) above.

(7) Move calibration fixture to LEFT VERT compartment and time base to A HORIZ compartment.

(8) Repeat (4) through (6) above.

NOTE

Do not perform (9) through (14) below if TI has option 21.

(9) Set BEAM 2 VERTICAL MODE switch to LEFT.

(10) Move time base to B HORIZ compartment and repeat (4) through (6) above.

(11) Move calibration fixture to RIGHT VERT compartment and time base to A HORIZ compartment.

(12) Set BEAM 1 VERTICAL MODE switch to RIGHT and repeat (4) through (6) above.

(13) Set VERTICAL MODE switches to BEAM 1 LEFT and BEAM 2 RIGHT.

(14) Set HORIZONTAL MODE switches to BEAM 1A and BEAM 2B and remove calibration fixture.

b. Adjustments. No adjustments can be made.

18. Power Supply

NOTE

Do not perform power supply check if all other parameters are within tolerance.

a. Performance Check

(1) Set TI POWER switch to off.

(2) Remove power supply from rear of TI, leaving cables connected (power supply does not have to be moved from type R7844).

(3) Position controls as listed in **(a)** through **(d)** below:

(a) CALIBRATOR 4V pushbutton in.

(b) READOUT INTENSITY switch to OFF.

(c) GRAT ILLUM control fully ccw.

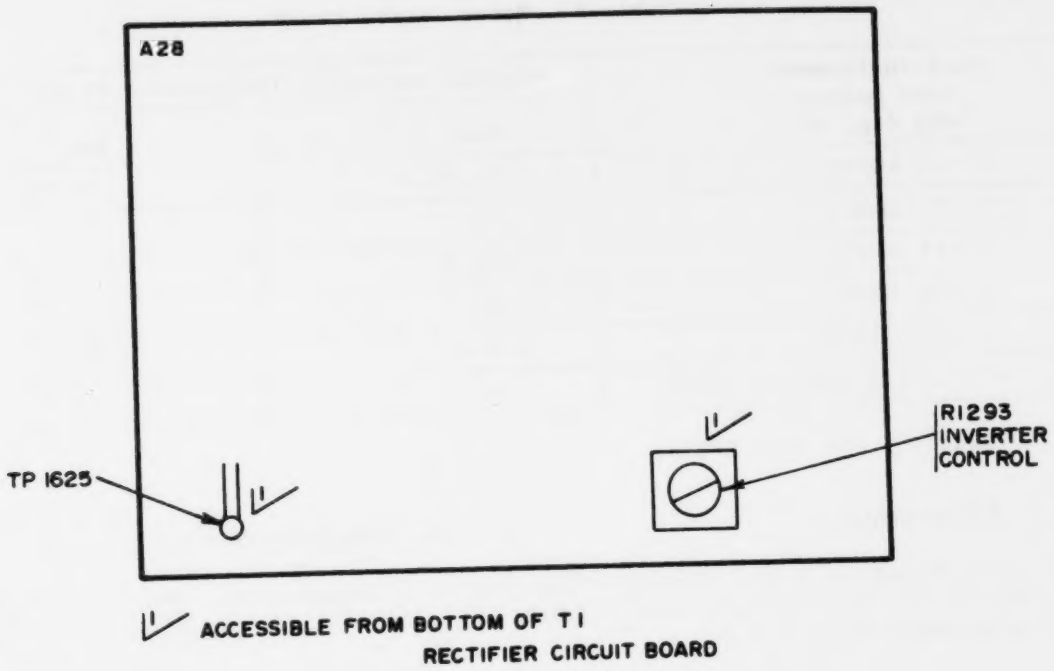
(d) BEAMFINDER 1 and 2 pushbuttons out.

(4) Remove all plug-ins from TI and turn on power.

(5) Connect digital voltmeter (A3) between A29 TP-50 SENSE and A29 TP GND SENSE (fig. 4) (fig. 9 for type R7844), using cable and adapter (B5 and B2). If digital voltmeter does not indicate between -49.8 and -50.2 V dc, perform **b**(1) below.

(6) Connect digital voltmeter between A28 TP1625 (fig. 4) (fig. 9 for type R7844) and chassis ground. If digital voltmeter does not indicate between +45 and +55 V dc, perform **b**(2) below.

(7) Connect digital voltmeter positive lead to test points listed in table 6 and common lead to A29 TP GND SENSE. If digital voltmeter does not indicate within limits specified in table 6, repeat (5) and (6) above for best in-tolerance condition for all test points.



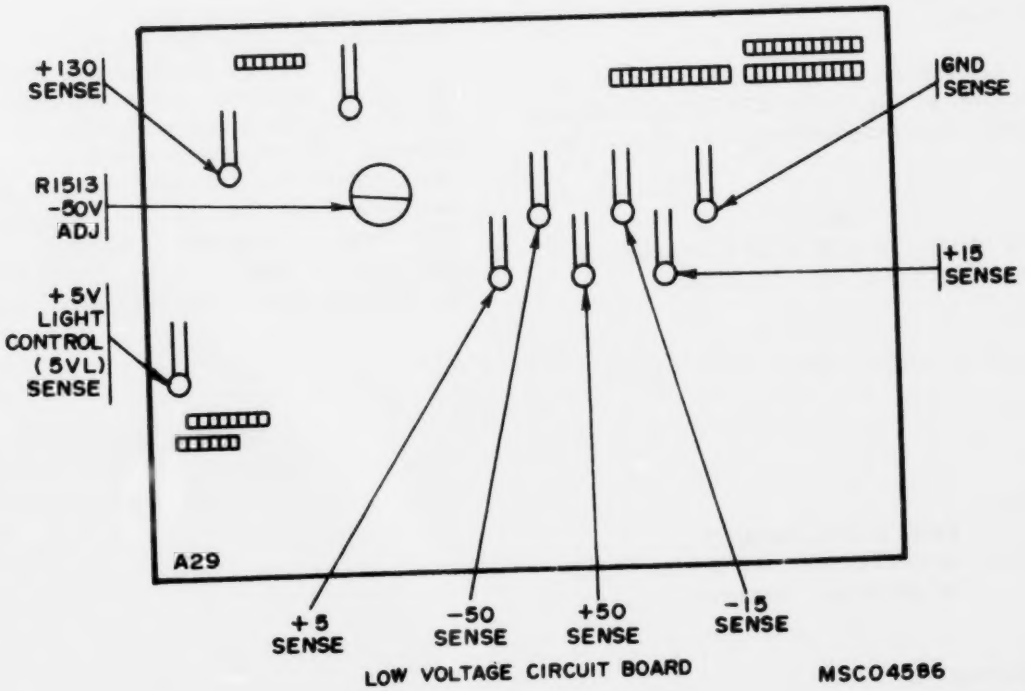


Figure 9. Test instrument boards A28 and A29.

Table 6. Power Supply Check

Test instrument test points (A29 fig. 4)[1]	Digital voltmeter indications (V dc)	
	Min	Max
TP -15 SENSE	-14.85	-15.15
TP +5 SENSE	+4.9	+5.1
TP +15 SENSE	+14.85	+15.15
TP +50 SENSE	+49.5	+50.5
TP +130 SENSE	+124.8	+135.2
+5V LIGHTS CONTROL ILLUM.	+4.5	+5.5

[1]Figure 9 for type R7844.

b. Adjustments

(1) Adjust -50 V ADJ A29 R1513 (fig. 4) (fig. 9 for type R7844) until digital voltmeter indicates 50 V dc (R).

NOTE

Any change in A29 R1513 adjustment may affect the operation of all TI circuits.

(2) Adjust INVERTER CONTROL A28 R1293 (fig. 4) (fig. 9 for R7844) until digital voltmeter indicates between +45 and +55 V dc (R).

NOTE

Any change in A28 R1293 adjustment may affect the -50-V dc supply.

19. Final Procedure

a. Deenergize and disconnect all equipment and reinstall protective cover on TI.

b. When all parameters are within tolerance, annotate and affix DA Label 80 (US Army Calibrated Instrument). When the TI receives limited or special calibration, annotate and affix DA Label 163 (US Army Limited or Special Calibration). When the TI cannot be adjusted within tolerance, repair the TI in accordance with the maintenance manual. When repair is delayed for any reason or the TI cannot be repaired with local resources, annotate and affix DA Form 2417 (US Army Calibration System Rejected Instrument) and inform the owner/user accordingly in accordance with TB 750-25-1.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

DON J. DELANDRO
Brigadier General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-34C, Block No. 319, requirements for calibration procedures publications.

☆U.S. GOVERNMENT PRINTING OFFICE 1985—547-649/19511